

AVIATION WEEK

APRIL 18, 1949

A MCGRAW-HILL PUBLICATION

"Again **BG** spark plugs helped me do the job" *Bill Odom*



As on all his previous round-the-world flights, Captain William P. Odom has again relied on **BG** Spark Plugs. They provided reliable ignition for the Continental engine of his Beechcraft Bonanza during his recent record-breaking, non-stop flight from Honolulu to New York. We, who design and produce **BG** Spark Plugs, are proud to have participated in this great achievement.



FOR AIRCRAFT ENGINES... AIRCRAFT SPARK PLUGS

THE BG CORPORATION

NEW YORK 19, N. Y.

Relative sizes of 3-inch shut-off valves for military planes (left) and 4-inch selector valves for jets and commercial aircraft

Type D, selector valve with electric actuator

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 MANUFACTURED BY OUR
AIRCRAFT ACCESSORIES DIVISION

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Type F, 4-position 1½-inch selector valve

4-position 3½-inch selector valve with several options—also optional on other types

OUR AIRCRAFT ACCESSORIES DIVISION produces a wide range of fuel selector valves, manually and electrically actuated, for jet and piston-engine military aircraft and commercial and personal planes.

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Our testing facilities and experience are at the disposal of aviation builders and airline operators who want to know more about fuel selector valves and other products of our Aircraft Accessories Division.

Thompson Fuel Selector Valves have been approved and adapted for use in U. S. Air Force and Navy planes.

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Products of Our
AIRCRAFT ACCESSORIES DIVISION



FUEL, FUEL INJECTORS AND WATER INJECTION PUMPS — FUEL SELECTOR VALVES — FLOW REGULATORS — COMPRESSOR ASSEMBLIES



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Excludes: Receipts of income by
qualifying persons for more than 10 years.

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WEEK

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Gallery II: Wood

Wesley H. Mitchell
University of Tennessee, Knoxville[illegible]

Executive and Editorial Offices: 310 W. 42d St., New York 36, N. Y., Phone Longways 4-8115; National Press Bldg., Washington 4, D. C., Phone National 3414.

Dominican State University, Athens; 3, Baylor University, Waco; 4, Georgia 11, SUN Y, Manhattan Ave., Cleveland 11, Bronx 24a, 40 West St., Amsterdam 24a, Los Angeles 14, 422 S. Hope St., San Francisco 4, 40 West St., Houston 114 South St., Georgetown, Guyana; 5, Idaho, Idaho, Dallas, Denver, Evans, St. Francis, Jacksonville, Miami City, Knoxville, Lexington, Los Angeles, Louisville, Madison, New Orleans, New York City, Ocala, Oklahoma, Phoenix, Pittsburgh, Portland 10a, 5, 5, Louisville, Salt Lake City, Seattle, Wichita and 42 others.

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Perhaps 66 Avianon Gasoline and Engine Oil, go along with so many commercial, military, and private fleets, because their reputation has been established the hard way—with millions of hours in the air. The reputation of Phillips 66 Avianon Products and their wide acceptance are your guarantee of quality. The Aviation Dept., Phillips Petroleum Company, Bartlesville, Oklahoma.



AVIATION PRODUCTS

NOW...only \$40

**RCA L-F Receiver
Type AVR-104**

NOW...only \$149.50

**RCA VHF Transmitter
Type AVT-114**



NEW LOW PRICES!

RCA's popular lightplane radio for standard instrument-holemounting

■ These high quality units are popular among instrument airplane owners everywhere. They in both years for \$149.50. Both the Receiver and Transmitter are designed for mounting in standard 3" instrument bays.

The Transmitter, Type AVT-114

A powerful 50-watt output will bring a quick reply from the tower operator where another radio might get confused. Selective switch gives a quick choice of six channels in the range 115-125 mc. Transmitter includes Circuit Breaker and Inversion Switched control for ship antenna, and RCA Power Supply, Model AVA-127. Available for operation from either 6, 12, or 24 volt electrical systems.

The Receiver, Type AVR-104

Hard to believe but true—that so small a receiver can be so sensitive. Covers 200-415 kc. to receive four-course signals and voice transmissions.

Whether your drive for easy tuning or better frequency range, selective switch provides instant selection for major reception, noise rejection (squelch).

Three built-in, 775 kc. in standard tower frequency, or long distance tower frequency. Operates from same power supply as instrument unit and again has. When and easily may be operated from vehicle power supply or battery pack. Provisions for choice of headset or battery pack when long.

Applications

This standard aviation radio program will appeal to lightplane owners for three possible applications.

1. Receiver and battery pack for stand-by or emergency use. Or installed as primary receiver requiring a generator or operating on additional lead-in the electrical system.
2. Transmitter but use as a primary transmitter with generator three-course power. Or installed as auxiliary transmitter for headset and four-band diversity.
3. Complete system employing both receiver and transmitter two-course complete primary 2-way radio installation for personal pilots.

Order from your RCA Aviation radio dealer today

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CALIFORNIA	Radio America Corp., San Francisco
COLORADO	Radio America Corp., Denver
CONNECTICUT	Radio America Corp., Hartford
DELAWARE	Radio America Corp., Wilmington
FLORIDA	Radio America Corp., Jacksonville
GEORGIA	Radio America Corp., Atlanta
ILLINOIS	Radio America Corp., Chicago
INDIANA	Radio America Corp., Indianapolis
KANSAS	Radio America Corp., Kansas City
KENTUCKY	Radio America Corp., Louisville
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MICHIGAN	Radio America Corp., Detroit
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WYOMING	Radio America Corp., Cheyenne

AVIATION REVIEW
RADIO CORPORATION OF AMERICA
INCORPORATED PHOENIX, ARIZONA, U.S.A.
In Canada: RCA Victor Company Limited, Montreal

NEWS SIDELIGHTS

Storm Signals

U. S. Weather Bureau and certified airlines are cooperating to eliminate dangers resulting from transport aircraft flying into areas of extreme low barometer.

Cases involving a Northwest Airlines Martin 2-0-2 near Winona, Minn., last Aug. 29, and a Slick Airways C-96 near Columbia, O., last May 24, apparently were caused by storm-related conditions when the planes encountered favorable conditions.

Investigation said the Slick Airways accident might have been avoided if a report of the favorable low barometer by a passenger transport pilot to his own company's radio station had been made available generally. The Air Transport Assn. has now recommended that its members establish procedures so that dangerous storm conditions will be reported immediately to the nearest U. S. Weather Bureau office.

Skin Problem

CAA has proposed an aerodynamic derivative test on the Convair Learjet to deal with recently reported difficulties concerning the folding back of the upper and lower horizontal stabilizer during takeoff.

The tests provided for an additional series of stall attempts at the stall speed in the air selected with the work to be completed at the next summer tests inspection.

Management Shifts

Management shifts in some top aircraft manufacturing companies are still in the wind.

Wally, for major programs on the Convair-Curtis Wright merger and a possible shift at the higher levels of the Glenn L. Martin Co. Mr. C. E. Edwards, Mr. (Pop) Powers, retired veteran of USAF procurement and personnel development, may be one of the new arrivals in Curtiss Wright.

Airlift Cost

Cost of the Boeing airliner for fiscal 1949 is going to be approximately \$113 million according to Air Force disclosure to the House Appropriations Committee.

The committee approved a \$43 million supplemental appropriation to help defray airlift costs. USAF originally asked for a \$93 million supplemental

Stratojet Puzzle

Industry observers are wondering how the U. S. Air Force's procurement puzzle will be solved on the elaborate production program under way for the Boeing B-47 Stratojet bomber.

USAF has announced orders for 15 Stratojets out of fiscal 1949 funds, but looking at Boeing's Douglas plant is going ahead as a level for high volume production and subcontracting has already begun in a scale that confirms planned production for as many as the 12 new ones.

Possible is where USAF will get the money to pay for this larger program (fiscal 1949 procurement funds are all allocated) and what Congressional appropriation body will say when they get word of USAF commitments for in excess of current appropriations or current authorizations.

This was paid to \$45 million by the Budget Bureau leaving only \$6 million to cover actual operational costs.

The other \$39 million has already been allocated for the purchase of 21 Douglas C-77A Stratojets, which is re-planned. However, Air Secretary Douglas has estimated that the airlift requires 68 C-77A. Delivery of the 21 C-77As to be bought from the airlift supplemental is scheduled for the first quarter of 1951.

"Thank You, Mr. Smith"

Cordell Young, of the "Thank You, Mr. Smith" advertisement which Douglas Aircraft Co. placed in several newspapers last week, seems to disclose a somewhat and authentic behind the young, kindly environment, reported toward the American Airlines president and his associates.

Background for the Douglas ad was the earlier American Airlines ad which showed a picture of a stratojet apparently outgassing as "AA thought DC-7C, with a cockpit." This Month's Glassed Off Piece Makes Its Last Flight.

The AA ad said full tribute to the DC-7C as "every mile pure through-bred" but in following paragraph disclosed it into the line of retired old timers with. "The DC-7 will disappear

contrast to save the public in a limited way but in the end it will be seen as America's last flying series."

Douglas insisted via his ad that "It (the DC-7C) has done its best, reliable job in quantity, as fast as every corner of the world. It is doing that job now, here and everywhere. And for years to come it will go on, providing dependable transportation wherever the need may be. In a few months the Douglas series DC-8, a much more modern and rugged old friend will also be available for service and service requiring better performance and greater passenger capacity."

Whose Subsidy?

Recent newspaper advertisements by airlines claiming they are subsidized were eyed closely by airline officials. Few people realized that the ads contained with the airlines' unpublished request for an additional \$22,500,000 in government aid to pay off their operating costs.

The Interstate Commerce Commission gave the airlines a 23 percent (15,000,000) temporary rate increase in December, 1947, but the "subsidies" airlines now want 35 percent more.

Tax Facts

House Appropriations Committee's criticism of the Civil Aeronautics Board and Civil Aeronautics Administration for failing to put into effect a plan for changing taxes now has a hollow ring. Congress rejected on the 1948 fiscal year Commerce Department bill disclosed. "Although the committee has suggested your plan for the tax that the airlines should pay part of the cost of maintaining the federal system, both CAA and CAA want a major increase in the cost of the companies, meaning that they are not self-supporting." The fact is that only in 1947, CAA placed before Congress a plan for reducing the government for its airlines for services facilities by an aviation gas tax, a transportation tax on passengers and cargo movement, and a 10 percent reduction in the tax on government traffic.

Congress has not even considered legislation to implement the plan, and CAA and CAA do not have authority to impose taxes. Congressmen generally agree with CAA and CAA that it is difficult to pay their substantial air-line profits with one hand and bite it out in taxes with the other.



NEW POWER FOR THE "SUPER" DC-3

... Cyclone 9 Now Certified for 1475—1525 Horsepower

The FAA has issued a Type Certificate approving the Wright Cyclone 9R— with a take-off power range of 1475 to 1525 horsepower—for commercial use transports.

To the Douglas "Super" DC-3s, latest version of the world-famous biplane, the Cyclone 9R brings—

... new power—1475 to 1525 horsepower for improved take-off performance.

light weight—the lightest weight

engine in its power class. The Cyclone 9R weighs only 1350 pounds—less than one pound per horsepower.

... economical operation—because of lower fuel consumption and improved cylinder cooling characteristics.

... low maintenance and overhaul costs—because of the simplicity of design inherent in the Cyclone 9R's rugged, reliable engine.

... other advanced features—such as

smooth fuel delivery, power control and in-piston use of automatic propeller feathering—water injection for maximum take-off horsepower with 100 octane fuel.

Since its early association with the Douglas bi-engine transport, the Cyclone 9 has steadily progressed with this "father of the airbus." Today it is ready again to improve the performance and extend the usefulness of the DC-3.

POWER FOR AIR PROGRESS

WRIGHT

Aerospace Corporation • Wood-Ridge, New Jersey

NEWS DIGEST

DOMESTIC

K. E. Van Every, chief of aerodynamics, Douglas Aircraft Co., last week was presented the Wright Brothers Medal for 1945 at the National Aeronautic and Astronautic Association of the Society of Automotive Engineers in New York. Award was given for his paper "Aerodynamics of High Speed Airplanes," delivered last October at the SAE aerodynamic symposium in Los Angeles.

United Helicopters (Hiller 160) landed as a New York City East River port, completing a coast-to-coast flight covering 5230 miles and including stops at various points in the country. Stanley Hiller, Jr., company president, piloted the craft on the last leg of the route.

Port of New York Authority formally took title to Eastern Air Terminal, completing its purchase of the 500-acre airport for \$1,115,000. Pending a preliminary management arrangement, Fred L. Wilcox, former owner, will continue as president of the Teterboro Air Terminal Corp., operator of the field.

FINANCIAL

Texaco Engineering & Manufacturing Co. stockholders approved a reorganization plan including the issuance of \$66,000 shares of common stock, of which 447,450 shares is to be exchanged for the 111,973 shares of common stock outstanding. In addition, \$194,260 of the net assets in excess of par value is transferred to the capital account, bringing the latter to \$447,450.

Boech Aircraft Corp. declared a quarterly dividend of 25 cents per share on its 1951,565 shares outstanding on Apr. 16, 1949. Gross sales for the quarter ended 3-31 were about \$4,400,000.

FOREIGN

United Netherlands Aircraft Co. (Rohden) has completed the prototype of a new transport airplane built to KLM specifications. Although KLM's main base is in the U. S., actually, the line is making a record of its own Dutch aircraft industry as a source for new transport equipment.

Indian Parliament has appropriated \$36 million for the Indian Air Force for the 1949-50 annual defense expenditure. The Indian Army will receive \$160 million and the Navy \$30 million. Brazil has completed plans for the construction of a large airport at Curitiba in the southern State of Parana. It will be capable of handling four-engine aircraft.

INDUSTRY OBSERVER

Parsons Helicopter Co., Morton, Pa., won Navy competition for a fleet helicopter (Hawthorn Wins, Mar. 7), with its new design XH4P-4, but does not yet. Navy actually awarded to buy 135 helicopters for fleet duty in carriers and carriers for rescue, communications and observation work. Bidding the 10P will be Parsons's second helicopter production job for the Navy with 10 H4P-1, low-place transport helicopter delivered to the Navy and Marine and for all-terrain H4P-2 helicopter new order construction. Parsons's competitors for the fleet order came from Sikorsky's low-place H4S helicopter.

Convair recently won a Navy design competition for a water-based fighter with its State, a jet-powered flying boat fighter that can also function as an attack plane and is designed for speeds in the transonic range. Only other competitor was Curtiss-Wright. Convair will build an experimental prototype of the State for Navy evaluation.

Cessna L. Martin Co. has designed a new set of wings for the XP5M-1 experimental flying boat designed to test long shorthanded on the flying boat field. Original XP5M-1, now under test at Patuxent River, and an old set of Martin-McCormick wings on the radically designed hull. Martin hopes to sell the new version of the XP5M-1 to the Navy as a water-based anti-submarine patrol plane.

Convair's XP5E-1, radically designed flying boat patrol bomber, has been ordered out of the San Diego plant to await its four Allison T-40 turboprop engines. The first experimental 3500 hp T-40 is now installed in the nose of a B-17 for initial test flying at Inland Empire. Navy will probably buy the P5E in two versions: one for tactical operations in a long range, high speed (400 mph) patrol bomber and the other as a transport. In the transport category the P5E was in competition with the Martin JB-52, latest version of the Men.

Cessna will probably get an Air Force order for 38 additional LC-126 liaison planes out of fiscal 1950 funds. The LC-126 is an all-steel shell purchased of the Cessna model 195. USAF now has an order in for 12 out of fiscal 1949 funds.

Earl G. Bouslog, Chief, USAF deputy chief of staff for personnel, told a Congressional committee that the United States now lags two years behind the British in jet engine development. Craig added that the United States is rapidly catching up and should be even with the British in "a short time."

USAF and Navy are mutually interested in developing use of titanium in aircraft construction. USAF generally tested before Congress that titanium is stronger per weight and than steel and lighter than aluminum.

Boeing has the largest share of USAF turbine contracts, with approximately 38 percent of the total business, according to Wm. G. B. Wells, director of procurement for the Air Materiel Command. Wells and Convair won more than 2 in the USAF bid with Douglas and Lockheed in third and fourth places. Wells also indicated that 65 percent of USAF turbine business goes to those four firms with the remaining 15 percent distributed among eight other turbine manufacturers.

Allison-General Electric T-17 jet engine now requires overhaul every 45 hours after operation time in the Republic P84 fighter. Total engine life is now four overhauls at about 180 hours. This compares with an interval of 577 hours between overhauls on the Pratt & Whitney R-1830 piston engine.

Two top USAF development projects are the slow-opening parachute and an automatic aircraft rocket parachute. The slow-opening parachute is designed for high altitude high speed bursts where experience has shown that the opening rate of chute may be improved when that has resulted in broken back and crushed chests when the chute pops. Automatic rocket parachute is now ready for installation in combat aircraft for tests in air-to-air firing.

AVIATION WEEK

April 18, 1969

Box Score

What Truman Wants:

	New procurement obligations (million)	New planes	Software weight (million lb.)	Total new obligations (million)
Air Force	\$1640	1640	25	545
Navy	687	545	9	946
TOTAL	\$2327	2512	34	

What Vinson Wants:

	\$7140	7572	38	\$6.1
Air Force				
Navy	1070	1367	17	55.1
TOTAL	\$3170	4737	55	

What Appropriations Committee Wants:

	\$2127	2430	41.8	\$5.3
Air Force				
Navy	687	545	9	54.2
TOTAL	\$2904	3592	50.8	

Air Power Budget at Record High

Boost in President's request would put procurement funds at \$2.9 billion and buy 3393 new aircraft.

By Robert Hottel

Record procurement authority air power budget recommendations by the House Appropriations Committee for fiscal 1970 were expected to be approved by the House late last week.

Record air power budget would buy 3393 new planes with software weight of 50.8 million lb. at a total cost of \$2.9 billion. This compares with 3073 planes (software weight 47 million lb.) authorized for cost of \$1.7 billion voted last year for new aircraft procurement in fiscal 1969.

Second Step—Congressional approval of the Appropriations Committee recommendations would make the second step in the postwar expansion of 61.5 million lb. in power along the lines urged by the President's Air Policy Committee and the Joint Congressional Air Policy Board last year. The fiscal 1970 appropriations would raise the aircraft manufacturing industry subsidy to the level urged by both groups for a period of "interim transitional conditions" and would bring the U. S. Air Force up to 38 full strength combat groups and

of the projected 70 full combat groups. The House Committee's recommendations were a sweeping legislative victory for the U. S. Air Force. For the second successive year USAF needs to get a better than \$500 million increase in its budget from Congress. The House group asked Congress to boost President Truman's proposed USAF budget by \$351 million. This compares with an \$82 million increase asked by Congress last year.

More Planes—The additional \$351 million would acquire USAF in one tract for 2550 new planes with software weight of 41.8 million lb. at a cost of \$2,127 million. The new procurement obligations would consist of \$325 million cash and \$1,992 million in contract authority. All of that money would be for new aircraft whereas \$392 million of \$2 billion fiscal 1969 procurement funds were spent for housing, expansion of plant facilities and other things included in basic expansion of the aircraft industry.

In addition to the new obligations the budget carries on line of \$560 million to 38 full strength contracts let be-

tween 1946-49 and \$75 million to pay off contracts made between 1942-46. The \$75 million must be appropriated before at a statutory limitation of three years an expenditure of funds. To avoid a similar situation all funds in the current appropriation are allowed to be made available until expended.

Concomitant—The \$75 million includes \$40 million to pay Congress for B-55 bombers and spare parts, \$4 million on B-56 equipment contracts, \$11 million on four aircraft engine contracts and \$10 million on 70 research and development contracts.

The \$351 increase adds 881 new aircraft and approximately \$750 million in aircraft procurement funds to the President's budget. Also included in this boost is an \$18 million item for research and development to finance the following projects:

- Long-range fighter development.
- Supersonic bomber design studies.
- Ground attack plane development for Army support operations.
- New helicopter development.
- Guided missile development on a "jointly-developing" basis.

Remembered of the added funds will be spent for ground handling equipment for new aircraft; radar, personnel, and maintenance and operations for the 38 groups added to the President's 48 group plan.

Group Breakdown—The 10 additional groups will consist of five medium bomber groups, three fighter groups, one troop carrier group, and one light bomber group. The original 48 group program contained three heavy bomber groups, 11 medium bomber groups, six strategic reconnaissance groups (5 photo, 1 weather) and one support, one light bomber group, 17 day fighter groups, three all-weather fighter groups, one tactical reconnaissance group and one troop carrier group (short range, two medium). The 18 separate squadrons were 8 attack squadrons and two strategic support squadrons using C-97s as air transport squadrons for the heavy and medium bomber groups.

The Air National Guard program calls for three light bomber groups and 20 day fighter groups. An Reserve program will be expanded around three types of groups: a light bomber group equipped with Douglas B-26s, a light transport group equipped with Douglas C-47s, and a medium transport group equipped with C-119s. C-119s C-46s. At present the Air Reserve program has

only 32 B-26s, 6 C-47s and 1250 T-6 trainers. It is planned to add 56 B-26s and 361 C-47 and C-54 transports to make a total plane strength of 1616.

Plane Shortage—The Air Force also revealed some of its future plans for assignment of new and obsolete aircraft. It plans to convert 5 day fighter squadrons (now Reserve) into six National Guard) to all-weather fighters in soon as some of that type plane becomes available. The National Guard squadrons will get the North American F-47 (Two Mustang) and the Lockheed F-49 (in tactical version of the F-7000). Regular groups will be equipped with the North American F-49, a twin jet, 10,000 lb. all-weather fighter just going into production.

Strategic reconnaissance groups will be augmented by 17 C-130 Hercules per group for aerial refueling operations on long range missions. It is planned to equip five National Guard fighter groups with F-104 and F-104 jet fighters by the end of fiscal 1970.

Navy Even

Committee recommends amount Truman asked, rejecting plea for more.

House Appropriations Committee turned a deaf ear to Navy plea for a substantial boost in its fiscal 1970 air force budget.

The committee also rejected a plea by Rep. Carl Vinson (D. Ga.) to add \$345 million for 518 additional planes to the Navy's aircraft procurement budget. (Aviation Week, Apr. 13).

The House group opposed President Truman's original request for \$287 million to buy 945 new Naval planes. The Navy's plane procurement program is scheduled as follows:

- Fighters—525

- Attack bombers—151
- Patrol bombers—51
- Transport—5
- Helicopters—15
- Training—15

Fighter contracts will be split between Grumman's Panther (F-7F) and the Chance Vought Golden Eye (F-7G). Grumman's Panther planes will be used by the Douglas Skyraider squadrons and the Grumman All-weather. Patrol planes will be the latest version of the Lockheed Neptune (P-7V) and the Chance Vought F-7G. Back of the helicopter will be the Sikorski HO4S, a new plane under test, with some 1969-70 tactical transport helicopters.

More Jets—Navy procurement will reflect a further emphasis on jet-powered planes with 68 percent of its fiscal 1970 procurement going for jets compared with 48 percent in 1969.

Tied in size toward heavier and more expensive planes with an average weight of 9150 lb. for 1950 compared with \$665 lb. in 1949. Navy cited the average cost of a jet-powered aircraft in \$2,517 compared with an average of \$694.934 for a piston-engine powered plane. This increase in size and cost reduced the Navy's original goal of 1532 new planes for fiscal 1969 to an actual procurement of 1225.

Navy answer, led by Vice Admiral John Dale Price, deputy chief of Naval operations for air, briefly assailed the President's budget for Naval aviation for possible inadequacy. Admiral Price testified that at the 1950 rate of procurement the Naval air force would be reduced to an operating force of less than 3600 planes by 1975.

Cost as Factor—Immediate reduction will cut the Naval air service from a total of 14,000 planes available on Feb. 1 to 13,070 by next July and down to 12,985 by July of 1970. Large aircraft carriers will be ordered from 11 to 10 planes by a reduction of two air

carrier combat groups. The Navy air admirals testified that they needed a total of 1800 aircraft carriers to bring naval aviation to a state of "actual readiness" and that an additional 846 planes were required in fiscal 1970 procurement to offset this gap.

According to the report, Naval air budget eight light attack carriers of the Malvern and Essex types will be operated along with four light carriers and four escort carriers. Total of 22 air carriers including 14 large carrier groups, 8 smaller groups and 34 patrol squadrons will be maintained during fiscal 1970.

Research and development funds cut in the President's budget will force the Navy to abandon development of five advanced aircraft prototypes and delay development of four others from four to nine months. Rep. Vinson urged that a \$16 million addition be made to the Naval air research budget to restore those new aircraft projects.

CAB Under Fire On Grounding Pay

The Senate Appropriations Committee is set for a showdown over the Civil Aeronautics Board's request to pay at least an estimated \$4 million for losses through plane groundings.

Sen. Mayhew (D. S. C.), a member of the committee, described CAB's new policy as "shockingly absurd." "I can not even understand anyone suggesting that the Federal government pay private companies for not operating planes," he told AVIATION WEEK. The shutdown will probably come when the committee considers the second defense appropriations bill, some before the House, carrying over \$30 million in funds for restrictive land payments.

Committee Opposes—The House Appropriations Committee has already objected to the plan, condemning it as



Recent flight photo of the McDonnell F-4 Phantom II jet portection fighter shown test pilot Rick Eshbach putting the

McDONNELL'S PHANTOM F-4 Phantom II jet shown over the ocean. Note the fuselage door (dark) and the tail fin (dark) over the ocean.

combat reconnaissance equipment. Room extending from the rear of the aircraft contains test equipment.

report on the 1918 fiscal year Commerce Department appropriation bill. "The committee was strictly opposed to item of the Bureau of Civil Aeronautics showing a spending in \$4 million gift of the taxpayers' money to the Big Four airlines for transportation of its mail, a single parcel of which they never actually carried. In making such a decision under the guise of aerial subsidy, it would seem an expensive gesture of sympathy to those airlines for superfluous business lost due to the granting of a monopoly of first-class passenger and DC-3s which they had previously been operating with defective and dangerous equipment."

Commerce also later rejected an item, "Big Four," admitting that Eastern Air Lines, one of the "Big Four," will receive no part of the \$1 million for plane grounds. The money which will benefit from this category of funds are Transcontinental and Western Air, United Air Lines, American Airlines, Northwest Airlines and National Airlines.

► **Lines American-TWA, United and American** will receive \$2 million each over a five-year period in comparison for material losses incurred when Civil Aeronautics was grounded in 1945 and DC-3s later in 1947 and the first part of 1948. Exact amount being paid Northwest for the Martin 2-0-1 grounding last year and to National for DC-3 grounding losses has not been disclosed.

American Airlines already has protested that the \$2 million is inadequate to cover its DC-6 grounding losses. It estimates losses at between \$4,753,000 and \$5,752,000.

ALPA Back to NAL

An Air Pilot Association, members have returned to flight duty with National Airlines for the first time in over a year. Upon arrival a two-month strike against NAL last November, led by the union, ended with the return to work pact (including the name of physical examinations) kept ALPA personnel out of NAL cockpits off this month.

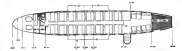
During March, National had 137 pilots in its payroll, according to ALPA President David L. Bedeak. This total included ALPA members, who were receiving base pay despite their inactive status, and non-ALPA pilots hired during the strike.

Bedeak had called on CAB to investigate the costs involved in this "double payroll" (American West, Apr. 6).

But with settlement of the latest grievance, ALPA is expected to end the number of its pilot personnel sharply.



OLD DC-3 gets 19 in. more (left seat) on baggage and with other changes becomes SUPER DC-3.



SUPER DC-3 which in this version will be able to carry as many as 40 passengers.

Super DC-3 to Fly Next Month

SANTA MONICA—Prototype of Douglas Aircraft Co.'s Super DC-3 is expected to fly in May.

Soon after, the replacement for the steady old DC-3 will begin a series of demonstrations. From then, Douglas hopes to develop a growing volume of foreign and domestic demand.

More than 600 DC-3s and C-47s are in operational service, out of nearly 10,000 originally built. If Douglas can top even a small fraction of this number, it will make a healthy transport business. Two prototypes—Super DC-3s—formerly regular DC-3s purchased from American Airlines and United Air Lines—are currently undergoing alterations at the Douglas Santa Monica plant. An Airline Wings editor recently inspected a Super DC-3 baggage assembly in which a 19 in. structural joint was made in the baggage loading area (see additional pictures page 15).

► **Three Variants**—Douglas has plans for three versions, to accommodate 29, 31, and 44 passengers. Last two versions incorporate a convertible cargo section at the rear end of the cabin. Eight seats can be rapidly folded to provide cargo space in this area.

Takeoff gross weight will have to be increased to 25,200 lb. to make use of the 31- and 44-passenger arrangements. This will require installation of auto brake propeller feathering equipment not needed with the 29-passenger version, which has a takeoff gross of 25,100 lb.

Typical ranges of 230 and 338 miles are used in revenue routes planned by Douglas. One calculation on the 40 passenger version indicates the plane can show a 57% load factor with only 16 passengers, while carrying 338 lb. per sq. ft. Flexibility of cargo conversion design is expected to make the airplane attractive to short haul lines where passenger loads and cargo requirements vary.

Super DC-3 is expected to cruise around 245 mph, (R-1520 CV8B) or Pratt & Whitney R-3000 D5 engines DC-3s, currently equipped with Pratt & Whitney R-1520 engines, cruise at 195 mph.

► **New Wing**—Aerodynamically, Douglas has cleared up the Super DC-3 considerably. The wing is now from the nacelles out. Outer wing panels have squared-off tips, are flush mounted, and in an optional feature, will carry 400 gal. additional fuel. Tail surfaces are beefed up for increased strength and control.

Engine nacelles are fitted with new leading edge enclosures. Revised hydraulic system operated at 3000 psi, gives tail landing gear retraction from the tail wheel is partially stricken.

Optimal improvements include a passenger door which lets open steps, built-in wing service and a new built-in door which is used for maintenance.

► **Service Conversion**—Douglas is not overlooking prospects of converting

Air Force C-47s to Navy R-10s (service elements of the DC-3). And, the company has also proposed plans for conversion of numerous DC-3s. Some of the C-47s have some structural beefing at the tail not found in airline DC-3s, inner nacelles are required to correct a 4.47 in. gap. Super DC-3s

Proven general leading edge techniques for the DC-3s, in the main, will still be applicable to the new version. Time used on the ground, according to Douglas engineers, should help compensate the difference in cruise speed between the Super DC-3 and the standard postwar-era transport aircraft used by many major airlines.

Douglas expects its biggest market will be airlines, not airlines and foreign airlines, where general design shortages seriously put a barrier to costly equipment purchases.

The company is prepared to perform conversions in any of its major configurations, with various equipment options, including electric Pratt & Whitney R-3000 D5 engines, rated at 1450 hp for the standard, or Wright R-1620 CV8B engines, rated at 1975 hp, for the Super DC-3. Cost factors for the modernization are based largely on the price Douglas negotiated for All American Airlines, a project similar in many respects to the Super DC-3. Per plane cost will vary between \$14,000-\$20,000.

A CAB estimate of its unit rate from carrying the DC-3s in 1973, at which time current rates have a placement asset.

NACA Reports

New urgency given to research programs by supersonic flights.

"Progress in aerodynamic research during the past year has been most rapid perhaps than in any other year since the Wright Brothers' first powered flight," says the National Advisory Committee for Aeronautics in its annual report for fiscal year 1946.

The Committee's records program during the past year were conducted in an atmosphere of urgency as a consequence of the fact that the speed of sound has been repeatedly exceeded by a special research airplane," the report states, and provides assurance that "continuous scientific research can provide the engineering knowledge necessary for the design of technical airplanes to operate at the higher speeds now required."

► **Program Report**—The report contains a detailed outline of research projects in the fields of aerodynamics, aircraft propulsion, aircraft construction and aircraft operating problems.

airplane, aircraft construction and aircraft operating problems.

AERODYNAMICS

For the very first wings that are desirable for high-speed flight, reasonable maximum lift and stall characteristics require not only leading-edge flaps but also leading-edge flaps. An NACA 64A006 airfoil equipped with a drooped nose flap and a plain trailing-edge flap was investigated at high Reynolds numbers and low Mach numbers.

These tests indicate that the optimum combination of drooped nose and plain trailing-edge flaps increased the maximum velocity lift coefficient. Tests show that the upper-surface leading-edge flap is, in general, a more effective leading-edge device than the lower-surface leading-edge flap. Either type of flap, when a forward shift in the zero-lift moment is at high angles of attack.

► **Sharp Wings**—Tests in the Area 7 by NACA wind tunnel show that a wing of the highest possible aspect ratio with sweepback at 60 or 65 deg. is capable of sustaining flight efficiency at Mach numbers up to 3.5. Delta wing tests indicate that no serious longitudinal stability problems should be encountered in flight with such a wing at the highest Mach number involved.

Calculations show that at Mach numbers above 2, a very thin, sharp-edged wing without sweep may be superior in performance to a swept wing that is not swept behind the Mach cone.

Boundary-layer investigations have confirmed theoretical predictions of high lift, low drag and improved stability with consequent improvement in altitude and flight characteristics at speeds up to 500 mph.

POWERPLANTS

A study of attempts in the altitude wind tunnel indicates that optimum

performance even a wide range of operating conditions requires an adjustable exhaust nozzle area.

An investigation of changing "hot state" of turbojet engines indicated that excessive fuel flow rates at low RPM were the most likely to be exceeded by exceeding fuel atomization, which can also result in a 50 percent reduction in required thrust engine energy.

An analysis of a gas-turbine engine (ideal compressing engine supplying exhaust gas to a jet nozzle) indicates that it should be capable of operating with a higher specific fuel consumption at 11.15 per hp and a specific weight comparable to that of a typical turbojet engine.

AIRCRAFT STRUCTURES

The theory of diagonal tension in flap was mathematically extended to curved webs as approximated by cylinders in tension.

The work on strength of curved plate, as represented by modulus wing skin joint, was extended and a method was developed for determining the three axial loading stresses of unstiffened cylindrical shells under various loading conditions, including stiffness shell and the possibility of curved web irregular joints in axial compression reinforced by a centrally located chordwise stiffener.

An investigation of a fatigue test of a 45-deg. swept wing with the normal to span revealed that the stress phenomena present to occur are confined to that portion of the wing near the leading edge, the stresses in the outer portion being given by the standard formulas for straight wings. Major effect of sweepback on the stresses is in cyclic concentration of normal stress and vertical shear in the root zone.

► **Altitude Operating Problems**—A pro-



NEWEST FIRELY FOR FLEET

Douglas' Firely F4M-5 is the latest model in the twin-engine, low-flying rescue plane produced by Elroy A. Wright Co., Ltd. Powered like the well-known Firely M-4 with a 1250-hp Pratt & Whitney engine.

It differs from the old model which is in service. Although its primary function is day lighting, it also can be used for reconnaissance work. Other versions are for night lighting and anti-submarine.

Securities Control Again an Issue

Financial difficulties of airlines strengthen CAB's hand in plea for power over capital structures.

Control over issuance of securities and the disposition of capital structure of airlines is due for renewed consideration.

The Civil Aeronautics Board has long sought the right to pass upon air line financing while the industry has consistently resisted. Financial difficulties of a number of air carriers now appear to have strengthened the Board's hand.

This question may figure prominently in the pending reorganization of airline finance by the Senate Committee on Interstate and Foreign Commerce, as indicated by recent testimony of CAB Vice Chairman Oswald Ross before that group. In reviewing industry proposals to secure regulatory relief, Ross also revealed an interesting insight on the CAB's past financing.

TWA Plan.—The CAB spokesman declared that a financing program for TWA involving \$100 million would have permitted the carrier to withdraw the groundings and the pilot's strike in the international field without suspensions. This plan recovered a capital structure reorganization at about 20 percent debt and 80 percent equity capital.

Said Ross: "[The] financing plan did not go through, and they resorted to debt instead. All of the industry debt is that TWA did it. I think today TWA has a capital structure as weak as the equity has entirely disappeared and the debt represents almost 100 percent, or something like that."

"Chicago & Southern proceeded on an equity financing basis, and while it was in trouble later, it was able to ride out the trouble. American resorted to equity financing and American did not have any trouble during the past two years, but has been able to meet the loss without any critical situation developing by reason of the fact that it did have that great cushion of equity capital."

"The CAB would have required there to issue equity stock because there was plenty of equity money to be required at that time. These carriers would not have their present capital structure but we had the power to tell them they had to have a different kind of capital structure."

There are significant revelations. The TWA story, however, should be clarified in the light that as of Dec. 31, 1948, the company's capital structure consisted of about 60 percent debt and the balance of equity. This reorganization was made possible by conversion of subordinated convertible notes aggregating \$90,344,730 in August, 1948. Had this not been done, its equity would have remained under water.

Pitfalls. Assailed—Reorganized on TWA's past financing, Jackson points out it could have avoided it as an alternate course had been followed.

Indeed, it appears that the Export-Import Life Insurance Society of America, anxious to under the TWA loan, agreed to use money of basic form of airline operation and advanced the carrier \$40 million. This guaranteed conversion of a balanced capital structure for the carrier, and as indicated, made it vulnerable in a number of contingencies.

TWA, aided by new management and increased asset payments, rapidly is becoming a positive. Its conduct in easing the dead weight of that part of the liquidable loan originally designed to finance new aircraft but continued instead by past operating losses. Equitable, as all the other lines, has been forced to subordinate its loan with a series of modifications and concessions. It may be hoped to make further concessions before the TWA capital structure becomes unsalvageable.

TWA's current position is reflected in the gain in net working capital amounting to \$4,236,688 as of Dec. 31, 1948, compared with \$7,477,815 a year earlier. Depreciation charges, if carried as requested, should fully cover the indebtedness due this year on the company's debt. Monthly payments to service against the acquisition of 20 C-54s will aggregate \$4,123,391 during 1949. Following such payments, a debt of \$12,625,201 will remain against the company's equipment and make short of the debentures owed by the Flyable.

Argument for Control.—It is ironic that Flyable, an outspoken advocate of free fiscal enterprise, though its sympathetic in certain finance, has pre-

ferred CAB with a point argument for imposition of another set of controls over the airline.

Observers may question whether CAB could have developed sound capital structures among air carriers if it had power to pass over issuance of securities. Sent any point in over-valuation of the current stock pattern and to the fact that the Board may have shared industry opinions in making assets which today provide useful competition and assets of heavy subsidy payments.

By effectively sanctioning a capital structure through the authorization of the issuance of new securities, the Board, by its action, would imply that sufficient cash pay might be forthcoming to support the finances of the carrier involved.

A. A. Pennington.—This element is actually present in the CAB's present relationship with the Reconstruction Finance Corp. in sanctioning government loans to air carriers. CAB is required to certify to RFC that the applicant can discharge its obligations without benefit of a public reorganization, before RFC can make the loan. This requirement creates potential conditions.

For example, in one case CAB indicated an interest in possible membership of Northeast Airlines, in another action the Board made confirmation permitting RFC to advance \$1,794,000 to Northeast for new equipment purchases. Under existing legislation it is questionable if the Board could have acted otherwise. By withholding such confirmation, CAB effectively can force a carrier into a financial position where the only way out would take a long time to be resolved.

Earning Conditions.—In viewing airline finances, balanced capital structures are only possible if the industry is healthy enough to develop consistent earning power. If, by some cause, an agency restricts the industry's finances to relatively accepted capital structure, the action would be tantamount to the absence of stable earning conditions.

Continuation of existing competitive conditions and heavy subsidy payments, for example, would in short order wipe even any investment stability that may be achieved by the industry.

Finance, which are largely attributed to government loans, and this condition exists where heavy subsidies are made are very important in aviation. Earning power generated by a company's own efforts is usually an asset of much higher market valuation.

With and among carriers, an air carrier has much greater flexibility in arranging such financing at best with its market, and subject to conditions beyond its control. —Selig M. Shulman

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Korov Verbolit

New Russian Aircraft Revealed

While large helicopter and a trainer show influence of Western design, a small copier has development history dating from 1928.

Information on three new Russian military aircraft has been gained from behind the Soviet curtain. From confidential sources in Western Europe, Aviation Week has obtained the first authentic representations of these planes, together with all presently available details.

Two of the craft, a large copier and a trainer, are, respectively, the work of two well-known Russian designers—Borisikhin and Yakovlev. The other, a entry wing craft comprising a sparse framework on pylon, is the creation of Korov, a designer not generally known in the West.

Borisikhin Helicopter. The introduction of this rotating-wing configuration indicates that the Soviet Union is looking for conception of large, passenger-carrying copiers.

Steering from design and, headed by Professor Igor P. Borisikhin, the

craft exhibits ample evidence that Russia will follow the trend set by America and followed by Great Britain.

The new copier appears to be a scaled-up version of the two-seat Osova, which was shown publicly in 1944-45 at the Moscow Aviation Day display. It is likely that the new craft borrows all-metal construction, although the smaller ship was built of metal tubing and wood, with fabric covering.

Aeroacoustics in the passenger cabin assembly are reported to be far in advance of all two in the same class.

Three-bladed counter-rotating rotors are mounted directly above powerplant mounted on lower, stub wings. The engines are probably variants of the 600 hp plus ASH-11 model.

Landing gear is of simple tailwheel, with long carbon track.

It is presumed that the smaller Osova was used to prove certain de-

sign details embodied in the new copier.

Borisikhin Background. Prof. Borisikhin has had extensive experience in the field of rotating-wing aircraft. He has been engaged in this activity for the past 15 yr. or more. His work includes the SBA of 1934, an experimental helicopter incorporating the essential feature of two sets of three-bladed rotors of different diameter.

Some experience for the new helicopter may have been gained from a captured German Focke Achgelis FA 223 Dorohe (Dragon) six-seat rotor craft, taken to Moscow in 1944.

An example of this German copier was sent to both the U. S. and England at the same time. Britain "wrote off" the FA 223 after very few hours of test flying.

France and, more recently, Czechoslovakia, have both produced versions of the FA 223.



Borisikhin helicopter (above), and Yak 11 (below).



Korov Copier. The designation for this craft, "Verbolit," stems from the combination of "vermilion" and "vertical," meaning "vertical flyer." The term initially was used in 1928 when it was adopted to describe the first (Korov's?) Russian gyroplane, the KASKR II.

The Korov Verbolit design departs radically from the usual induction by the large Borisikhin helicopter. It is an extraordinarily simple craft that appears almost as elementary configuration.

Powerplant appears to be a two-cylinder, air-cooled unit connected through a series of gears to co-axial, three-bladed rotors.

The position similarities is unusual in Soviet design, and apart from the obvious water-lifting ability may have been adopted to attain the apparent overall simplicity.

Korov Background. Helicopter and gyroplane have been the special interest of the designer of this craft, N. I. Korov. In 1928 he was taking his first gyroplane, the KASKR I, in collaboration with N. K. Shchukin (the two names making up the type name, KASKR II). This was followed by the KASKR II.

After some five years, the next design accredited to Korov appeared—a helicopter-powered gyroplane, the A-7bis. This was followed by a variation of the design, the A-7bis, built in small quantities, these craft were adopted for forestry and survey work in the Far East, and as recently as 1941, were used for near line missions.

Yak-11. This new craft appears to be the Russian version of the North American T-6 house of which were supplied under Lend Lease.

The plane is being delivered to the

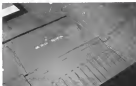
Red Air Force as an advanced trainer and introductory type to the single-seat, piston-engine fighters.

Of all Soviet construction, the Yak 11 two-seat trainer stands a departure from the trend of structural designs of Russian Lt. Gen. Aleksandr Sergeyevich Yakovlev.

The earlier UT-1, UT-2, and Yak 11 have been light aircraft. These have been powered by radial engines ranging from 110 to 170 hp, whereas the new Yak-11 has the more powerful ASH-11 radial.

By American standards, the craft appears slow, and has good visibility and a nearly cooled powerplant. Landing gear is retractable.

Radio and blind flying equipment is expected to be to be installed at the Yakovlev and Yak 11, calculated at the Tobolsk International Industrial Fair, Permian, in 1945.



Spoiler on Martin Marietta, center hand drive-top-hinge design, a down aileron and flap. Use a device to adjust aileron.

Spoiler Ups Aileron Effectiveness

A development by Glenn L. Martin engineers to increase aileron effectiveness is being used on four of the company's military aircraft—the AM-1 Mauler (illustration shown above), F4M Mauler, X-45 and F5M-1.

It is a spoiler installation which compensates the aileron aileron to offset quick roll for cruise action.

Current high-speed aircraft designs incorporating smaller, thinner wing planforms require the use of large span flaps to hold landing speed to a reasonable value. And larger flaps bring reduction in aileron span, with attendant decrease in rate of roll.

To cope with this problem, Martin engineers devised a new operational spoiler to disturb the flow over the top of the wing to affect maneuverability of the plane.

The spoiler is located on top of each wing, just ahead of the flap and close to the latter's outboard end. It is stored in the adjacent aileron and is operated automatically by a hydraulic cylinder when the aileron functions.

Thus, in normal level flight, the spoiler is retracted flush with the wing upper surface, but when the aileron is moved, the spoiler moves automatically and to a proportional degree, breaking the flow over the upper surface of the wing to afford greater maneuverability.

It's reported that the spoiler may be as useful as three times as effective as the conventional aileron, gives the same span.

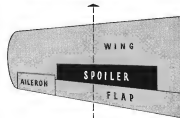
Theoretically it is considered possible to eliminate the aileron and increase the flap to wing's full length, using a spoiler aileron as sole lateral control.

In the present installation, to cope with an emergency in event of power failure and afford aerodynamic slowing of the lateral control system for pilot at least a "dead" aileron is provided.

NORMAL FLIGHT



SPOILER UP



Top sketch shows spoiler housed flush with wing surface for normal flight. Center diagram indicates location of aileron over

wing upper surface when spoiler is extended. Bottom sketch shows the spoiler's approximate location and proportion to aileron.



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Research Narrows Boundary Control Use

Early promise failing to materialize. Additional research desirable.

The improvement in wing efficiency through removal of air from the boundary layer often substantial advantages to relatively low-speed, large-range aircraft. But in many other applications its effects are not yet clearly understood. In a comparative status report, Albert K. Von Dörflinger and Lawrence K. Lotz, Jr., research engineers at the National Advisory Committee for Aeronautics, told the recent 17th Annual Meeting of the Institute of the Aeronautical Sciences that, based on present data, boundary layer control offers substantial improvement only on wings having an aspect ratio greater than 12 at 12 and a thickness ratio greater than 70 percent.

► **Class Worldwide**—Within this range of application, however, which includes strategic bombers and long-range passenger/transport planes, the gains are exceedingly attractive, amounting to a 30 percent increase in lift with equivalent L/D ratio efficiency. This remarkable gain is made possible by permitting the use of aspect ratios as high as 20:1, which are not deemed practically feasible by methods previously permitting the use of root thickness ratios as high as 90 percent.

In the past, high aspect ratios have been obtained only through the use of extremely thick root sections to penetrate the necessary span depths. These thick root sections often create flow separation throughout the range of service lift coefficients, resulting in a constant drag value and consequent impairment in the overall L/D ratio of the wing.

In such cases, the gains in profit in the root section approaches closely the loss to inboard drag created by the use of high aspect ratio. ► **Think Wing**—According to NACA is now completing a study of several thick wing sections (24, 28, and 40 percent) using methods to prevent stagnation. Preliminary results are shown in Fig. 1.

These data show that optimum aspect ratio for maximum L/D is increased from 11 to 20 by the use of boundary layer control with an accompanying increase in L/D of approximately 19 percent. Although the L/D of the wing with boundary layer control is higher than that of a solid without such control, the value of the profile drag coefficient at minimum L/D is greater for the wing with boundary layer control due

to the presence of the surface discontinuity.

If the effect of the discontinuity is added to the plan wing and its L/D compared with the boundary layer control wing, the latter shows up even more favorably, exhibiting an improvement in L/D ratio of 34 percent.

That this gain is applicable only to comparatively low-speed aircraft is seen in the fact that the critical Mach number for the 40 percent section, is used in the tests, is only 0.450, at about 100 mph, above 340.0. This speed could be increased, however, through a suitable amount of wing sweep. ► **Laminar Flow Extension**—Reduction in profile drag achieved by the use of boundary layer control is based on its theoretical ability to extend the region of laminar flow aft to a point in the vicinity of the suction peak point.

The well-known work of Fred Sydney Goldstein, as outlined in his "Weight Reduction Losses of the Institute of the Aeronautical Sciences, is predicated on the preservation of laminar flow removed to the 70 percent chord point. The standard NACA low-drag families of airfoils are designed for a theoretical laminar flow equivalent to the 90-60 percent chord point. In actual practice, however, USAF combat aircraft equipped with these low-drag airfoils exhibit laminar flow only to the 15-30 percent chord mark because of manufacturing techniques, weathering, field usage, etc. It is then apparent that actual laminar flow results are not yet applicable to actual combat craft.

This situation is aggravated by the fact that boundary layer control configurations are not as sensitive to surface irregularities than plan winging outside. Since it appears as if yet beyond the scope of manufacturing accuracy and field care to produce and maintain plan wings is with a smoother than laminar flow can be maintained at

the 15-20 percent chord point, it is obvious that effect along this line is far more urgent than work on methods predicated on the extension of the flow to the 60-70 percent point.

► **Reynolds Number is Important**—One reason for only optimistic claims for boundary layer control was the fact that laboratory tests had been conducted only at comparatively low Reynolds numbers.

In the past two years, research has obtained some of these results in higher Reynolds numbers and it is found that the trend became discontinuous. For example, only work was carried out at Reynolds numbers of 2.4 x 10⁶. Recent NACA tests of a symmetrical NACA (0410) actual using various data confirmed these earlier European results up to a Reynolds number of 5 x 10⁶ by actually preserving laminar flow over substantially the entire surface of the model.

As the Reynolds number was increased, however, laminar flow became exceedingly sensitive to minute changes in the shape of the slot entry and the flow separation occurred.

It was found that leaving the edges of the slot slightly with a lead piece produced sufficient changes in the slot pattern to affect markedly the maximum Reynolds number at which laminar flow could be obtained over the slot. Slot width was 0.007 in., slot spacing 0.75 in.

These same series of tests indicated that laminar flow would be obtained over substantially the entire upper surface at a maximum Reynolds number of 10 x 10⁶ but over the lower surface only to a maximum Reynolds number of 5 x 10⁶, despite the fact that the airfoil was symmetrical. The obvious reason for this additional irregularities in the lower surface and an examination revealed that these were so slight as to be noticeable only with the aid

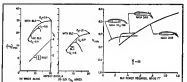


Fig. 1: Effect on L/D ratio of laminar flow control. Fig. 2: Effect on lift coefficient of boundary layer control by surface and blowing.

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of a powerful suppling glint. It is this apparent that use of section slits to increase the possible extent of laminar flow does not appear to be very attractive.

► **Mixing Lift Coefficient.**—In addition to its possible use as a drag reducing device, boundary layer control has also claimed attention as a means of increasing the maximum lift coefficient. This may be accomplished by causing a portion of the boundary air in the boundary layer or by injecting high energy air inside the boundary layer.

Relative advantages of these two systems depends upon the amount of blowdown required as a basis of the lift coefficient increases that costs.

Fig. 2 illustrates this by showing clearly that, whereas mixing produces extremely high lift coefficients, it requires proportionately high expenditure of blowdown power.

It will be seen that slotted and double-slotted flaps are used in these three configurations, since it has been determined that not only do such high lift devices provide greatly increased values of maximum lift coefficient in combination with boundary layer control but they also reduce inherently the angle of attack at which maximum lift coefficient is obtained.

It should also be noted that these are 18 percent sections. Generally, these results are improved by increases in thickness and induced by the use of lower thickness ratios.

► **Application to Swept Wing.**—Boundary layer control is receiving considerable attention at the moment as a possible solution to the problem of high-speed aircraft using thin, swept wings with accompanying low lift and poor stall characteristics.

Theoretically, at least, three characteristics result from the spanwise flow of the boundary layer towards the tips, which displace the boundary layer in the tip region and produce premature separation. Thus, the swept wing has an inherent form of boundary layer control. Unfortunately, there is no data available on the application of boundary layer control to swept wings, but the first steps in attempting to improve the low speed characteristics of swept wings should be the delay of leading edge separation on the outward portions of the wing, and research is highly desirable.

► **For Lateral Control.**—Investigations have been made of the use of boundary layer control as a lateral control device through its ability to change the lift over a portion of a wing. Thus, by reducing the lift over one wing panel while increasing it over the other, an aileron action could be provided. One of the major advantages of such an application is that control forces could be reduced to extremely low values.

(Continued on page 18)

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AVIATION WEEK, April 10, 1949

27

Born and Branded in Texas



There's a new breed in Texas—the "flying V" of Chance Vought Aircraft. It is being applied this month to the first F4U-5 "Corsair" to be built entirely in Chance Vought's new Dallas Plant.

CHANCE VUGHT AIRCRAFT
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ONE OF THE NEW SHAPES OF WAR'S AIRCRAFT EXPERIMENT

Jet-Thrust Vertical Takeoff Under Study

Model craft with pulse jet tested on whirl arm. Plane specs prepared.

Probing the feasibility of a military jet airplane which would come in any way for takeoff and landing, United Helicopters, Inc., Palo Alto, Calif., has conceived several model tests of such a configuration.

Stanley Hilder, Jr., UH1 president, has prepared specifications for a full scale prototype of such an aircraft. It would make a jet-thrust vertical takeoff and then assume a "normal" attitude for high subsonic flight on the support of a main wing. Landing would be effected by a brief vertical climb followed by tail fin descent on the cushion of the jet.

The armed services have reported the young helicopter designer's bid for a prototype development contract. However, Army Gen. Wick has advised what is believed to be reliable information that the latest concept of this type of craft is receiving serious study and that a design comparable to Hilder's may be under development by a major aircraft company.

Model Details—While the idea of an aircraft taking off in vertical attitude, employing a tail tapered landing gear, is not unique with Hilder it probably has not occurred before now the extensive scale model testing conducted by United Helicopters.

In proving experiments, a lightweight, all-metal model powered by a miniature pulsejet engine, was attached to a balanced whirling arm. Single-run control was gained by a movable deflection plate (acting as an "elevators" in low speed flight) mounted on the jet stream.

For the purposes of the test, upon the model was maintained by the whirl arm at all times, no rudder control was employed.

Multiple patterns of the tests show a smooth transition into horizontal flight under manual control, and finally a return to vertical hovering and pinpoint descent.

Hilder told Aviation Week that his interest in the design stemmed from previous experiments with a "convertible" aircraft using a control mechanism that would lift vertical thrust and converting to forward airplane flight by tilting the entire unit forward in gas propeller thrust.

Although scale models were what tested at UH1, mechanical complexity, ground further interest.

• **Jet-Scale Design**—Referring to his



Jet-powered model on balanced whirl arm in vertical takeoff attitude



Experimental convertiplane model on whirl stand



Artist's conception of United Helicopters design for vertical interest takeoff

Air Force Clarifies Research Objectives

A new regulation aimed at shifting Air Force research and development into high gear has been approved by Air Force Chief of Staff General Hap S. Vandenberg.

The ruling clarifies research objectives, gives research and development work and supporting credit to individual scientists, and promises improved living conditions and career prospects to personnel associated with the program.

The policy has been under consider-

ation since early last summer and represents coordinated agreement of Air Force research personnel and leading civilian scientists. USARF regulation 90.18 is the first policy statement establishing comprehensive objectives in the conduct of Air Force research defined as the "fundamental investigation of all activities where the discovery of principles not already known to the Air Force may be expected."

► **Mission**—It states that the mission of Air Force research activities "is to perform as quickly the necessary studies and experiments to insure timely advancements in concepts, techniques

and material for personnel selection, training, management, planning, operations, intelligence, engineering, design, test, production, supply and maintenance by application of the best scientific knowledge, personnel and facilities to specific problems and promising fields."

New regulation will govern all Air Force expenditures engaged in applied basic or background research as defined.

► **Background Research**—An analysis of all knowledge available to insure that stress of greatest military value are developed and that basic and applied research are guided into the most productive channels. The regulation states that in background research the potential impact of a proposed project on the national economy should be weighed carefully to determine the project's ultimate worth.

► **Basic Research**—Fundamental studies to provide new factual knowledge which goes beyond contributing to new concepts, techniques, and material of value to the Air Force.

► **Applied Research**—Application of scientific personnel, facilities, and knowledge to specific problems which arise from military requirements to determine a definite solution at the path of development of these problems.

The three fields of research are aimed at developing specific instruments or weapons which give the greatest promise with the end result being technical reports to the Air Force. Funds to support research activities will be allocated so that language research programs are possible. Areas that will not be determined by funds available for development or production. Budget estimates will support research in promising areas in addition to research for the solution of particular problems.

Regulation establishes the following: Air Force policy regarding research personnel, both civilian and military. Clear administration of assignments to ensure a scientific career for highly trained personnel; encouraging maximum possible freedom of expression and exchange of ideas; giving advancement on technical or administrative competence; increasing administrative burden; encouragement of professional advancement through postgraduate education, a fellowship program and participation in scientific gathering and promoting of individual job satisfaction by offering special talent.

It also promises to identify methods for basic considerations and setting concepts or sub-concepts for research and states that all research efforts will be able at other government departments agencies and universities will be utilized to a maximum.

what TWA likes about EDISON FIRE DETECTION

"...millions of miles without a single false engine fire warning."



Mr. L. R. Koepcke, Chief Engineer
Trans World Airlines



WE RECENTLY asked Trans World Airlines what they considered important features of Edison Fire Detection. In their answer, Mr. L. R. Koepcke, Chief Engineer, states that TWA's Edison-equipped DC-3's and Boeing Strato-liners have now flown millions of miles without a single false engine fire warning.

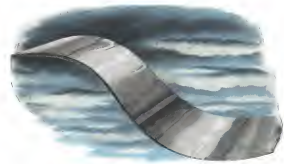
An impressive record, but not unusual for the Edison Fire Detection System. It is also probably an important reason why the Edison System is used on every major U.S. airline, and why it has been approved by the U.S. Air Force for all engine-protective installations.



* One of Mr. Koepcke's letter describing TWA's success in installing Edison Fire Detection will be gladly sent on request.

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Does the aircraft industry want longitudinally tapered sheet? Some airplane manufacturers want it badly enough to machine it from flat sheet. That suggests the need, at least.

Faced with this solid indication, Alcoa is continuing to analyze the problems of designing production equipment and determining methods for producing tapered sheet in mass metal to the industry. Progress to date enables us to supply experimental quantities for trial purposes.

If research demonstrates that rolled tapered sheet will make Alcoa Aluminum even more useful to aviation, we anticipate that satisfactory production methods will be available. In the meantime, we invite you to consult with our engineers and order different tapered sheet to run your own tests. ALUMINUM COMPANY OF AMERICA, 2162 Gulf Building, Pittsburgh 19, Penna.

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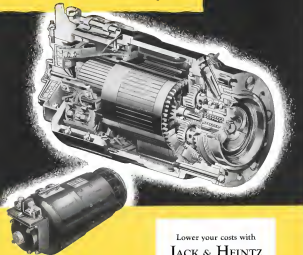
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Radio Terminal Connectors

To meet need for quick disconnect on radio chassis, well as rack mounting installations, Conner Electric Development Co., 7209 Hawthold St., Los Angeles 31, Calif., has developed new series of connectors designated "RTC". Advantages are stated to include low operation force, simplicity of mounting on chassis, interference being provided in acceptable section, provision to plug without for being down wires to plug after soldering to contacts, two types of terminal-connection and standard, and lightweight. Plug shells are phenolic, also serving as insulation, with metal parts treated to shock, clamp, and contacts. Series is available in five different sizes and terminal styles having 12, 16, 20, 24, 32, 36 complement of contacts for 16 and 20 wire. Mechanical spacing on all models is 1/8 in. with maximum thickness of 2500s, and recommended spacing of 5 maximum.



High-Torque Servo Motor

Especially adaptable to servo systems used in military and aircraft computers, radio direction equipment, automatic computers and various laboratory devices, new a/c servo motor developed by Kellman Instrument Division of Ingersoll Rand Co., 50-55 49th Ave., Elmhurst, New York, affords combination of high torque and speed, low inertia, small size and light weight. Unit is

480c, 115v, two phase, four-pole induction motor with torque to inertia ratio of 26,160 milinewton/sec. Inertia ratio of 11,500 gpm at 0.2 sec. It delivers 15 oz-in. and torque which varies directly with constant winding voltage. Feature is that it will stop instant when the excitation of the control winding is reduced to zero. Construction and tolerances are designed to insure accurate performance at extreme temperatures required for ordinary aircraft applications. Diameter is 1 1/2 in., length 1 1/2 in., weight is 6.1 oz. For applications where high acceleration is more important than small size and light weight, company has developed another four-pole servo motor, with torque to inertia ratio of 46,000 milinewton/sec., and shaft torque of 1.8 oz-in. Diameter is 2 1/2 in., length 2 1/2 in., weight 15 oz.



Regulated Power Supply

Designed to supply direct current for production or laboratory testing of active, electronic, and other circuit electrical components, new regulator unit is made by Melksham Electronic Research Co., Inc., Rochester 1, N. Y. Feature is automatic voltage control which holds d.c. voltage constant at preset value, regardless of line voltage fluctuations or variations in the d.c. load, to afford consistently uniform test conditions. Selenium rectifiers are used to provide high efficiency and infinitely long life with minimum of maintenance. Unit operates from 120v a.c. and delivers 100 ma. d.c. Output voltage can be set and maintained with 0.1 volt, anywhere within range from 0 to 1v d.c. Rectification is of three-phase, full-wave type, providing smooth output voltage wave shape without need for filtering.

PRODUCTION

West Coast Report

Six Firms Have 69% of Business

While western plants dominate military aircraft orders, eastern companies still control engine manufacture.

West Coast aircraft companies today accounted for more than two-thirds of the dollar volume of U.S. military aircraft orders, an Aviation Week survey shows. Future contracts may be expected to strengthen this position.

Latest available figures show that Boeing, North American, Lockheed, Douglas, Northrop, and Consolidated Vultee have received more than 1,448 new orders valued at \$1,319,615,000 for 2222 aircraft.

This represents 69 percent of the dollar total of all orders, and 62 percent of aircraft contracts.

Eastern factories—Republic, Fairchild, Grumman, Cessna, Sikorsky, McDonnell, Chance-Vought and Bell received 558,141,090 worth of orders for 1375 aircraft.

At the time of compilation these totals did not include any contract orders during the past month.

► **Employment.** Figures—Production in military orders is reflected also by employment in the western plants, which have 100,450 persons on payroll as Jan. 1, compared to a national total employment of 145,685 in aircraft manufacturing, excluding engine and propeller manufacturers. Slightly more than one-half of western aircraft employment is concentrated in four plants in the Los Angeles area.

As production increases western plants are beginning to absorb even side-line work. As of Jan. 1, the west's aircraft manufacturers claimed active use of 37,500,000 sq ft of factory space, including Convair's Ft. Worth, Tex., plant and Boeing's at Wichita, Kan.

► **Boeing Leads.** Boeing of 1946 airplanes may also show Boeing to be the industry's leader at \$127,504,661, followed closely by three other major engine makers—Lockheed, \$125,638,700; Douglas, \$118,551,945; and Convair, \$112,154,124.

Two eastern companies topped the \$100 million mark in sales, but both drew heavily on engine and propeller business for their orders. They are Eastern Aircraft Corp., with \$299,125,716, and Curtis-Wright Corp., with \$11,747,027.

It is not surprising that while light aircraft enterprises have become concentrated on the western seaboard, engine production has remained essentially in the eastern industry. Long-established concentration of heavy aircraft know-how in eastern industrial areas has been a factor in giving the east control of engine production manufacture.

Effects of eastern industries to produce power units for aircraft have been limited and, as the whole, concentrated from the standpoint of production volume.

Western engine engine manufacturers have been limited to low horsepower categories. Turbojet manufacturing has been concentrated wholly in experimental prototypes, with the probability that designs showing promise will be turned out to eastern plants for extensive production.

► **Propeller Production.** There are some eastern suppliers who anticipate that western industry may have opportunity to show considerable strength in the production of metal and metal propellers.

In the field of the former, Aerojet Engineering Corp. at Azusa, Calif., has established both engineering talent and production facilities for impeller manufacture of metal power units, and a strong competitor of Hamilton Metal, Inc., Dover, N.J. The latter has established itself as a builder of power units with the steel-powered jet engine experience, such as the X-1. Aerojet's identity is established in solid and liquid JATO engines and rocket power for guided missiles.

PRODUCTION BRIEFING

Fairchild Aircraft division of Hugen has delivered its first production model of its truck loading gear to the 14th Tropic Carrier Wing, Brown, Texas. Fairchild is scheduled to equip a complete squadron of C-47s with the truck gear for operational testing.

Kaiser Engine division of Fairchild at Farmingdale, N.Y., has received a

large subcontract from General Electric Co. to produce engine components for the GE J47 jet engine.

Good Control Aircraft Co. of Glendale, Calif., is overhauling and reconditioning six Convair F4Y flying boats for the French government.

Convair is averaging about \$375,000 per month in spare parts orders for the Convair-Learc. Building on spare orders, spare stocks of about \$1.5 million including 12,300 spare parts.

Vic Patches Industries of Los Angeles has a subcontract for pilot seats on the North American T-28 trainer and the ordered 1000 seats for the North American B-45. Production on both subcontracts is expected to continue until mid-1950.

Town South Co. of Buffalo is making back production orders for a subcontract on the Grumman F4F fighter. Employment is expected to rise from a low of 100 to about 1200 as the project goes from tooling to production phase.

A. E. Beardslee, Inc. of Buffalo, makers of equipment for shipping jet engines, reports a current backlog of \$151,000 in ordered orders and subcontracts. 1949 sales at about \$700,000 in comparison with \$577,800 for 1948.

Boeing Aerospace Co. has signed an agreement with Lockheed Air Service Inc. for servicing at Stamborough at Roswell and New Arthur Field, E. I.

Irving Air Corp. Co. and its British subsidiaries reported an increase in 1948 sales of \$573,773 over \$539,249. Firm had a net loss of \$14,435 for 1948, with current backlog at \$1,300,000.

Aerojet Engineering Corp. has appointed a JATO sales agency for Continental Europe—the Société de l'Etat de la Propulsion par Reaction de Paris. The Paris group is scheduled for the French government and now has 130 JATO sales agents in detail.

Stanley Aviation Corp. of Palo Alto has a backlog of \$100,000 in ordered orders from the U.S. Air Force and Navy and has completed \$390,000 in orders from the military. New work is for guided missile equipment. USAF contracts include plane equipment, engine thrusting device and guided missile equipment. The new month old company is headed by Robert M. Stanley, formerly chief test pilot of Bell Aircraft Corp.

Texas Engineering & Mfg. Co. has a \$300,000 contract with the Colombian air force for overhaul of 21 planes including 12 P-47 fighters, eight P-47 trainers and two P-47 trainers. TEMCO also has a subcontract from Boeing to make rollers, wheels, trim tabs and elevator for the B-54 bomber.

Albion division of General Motors reports a record production record of \$26,784,187 for 1948. Albion is now the largest manufacturer of jet engines.

Whittaker MOTOR SLIDE VALVES

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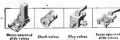
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BRIEFING FOR DEALERS & DISTRIBUTORS

95,994 CIVIL PLANES—As of Jan. 1, 1949, there were 95,994 civil aircraft registered in the U. S., CAA reported. Figure showed a total 1109 increase over the total of a year ago—94,887.

California listed 10,741 planes to take first place among states, said Texas was second with 7886. (The Texas total was a sharp drop from the state's figure of 9347 planes as of Jan. 1, 1948.)

Other states in which principal ownership of planes centers: New York, 4661; Illinois, 4559; Michigan, 4459; Ohio, 4118; Pennsylvania, 4047; Kansas, 3119; Florida, 2797; Indiana, 2778; Oklahoma, 2451; Iowa, 2383; Missouri, 2315; Washington, 2219; Wisconsin, 2202; Minnesota, 2119. Small increase noted in a reflection of the some postwar aircraft sales in 1948, a total of approximately 7000 planes, barely enough for replacement of planes retired for various reasons during the war.

COSMOPOLITAN SUB-DECK—It's been a hard winter as usual for personal planes and civil flying, and then to make it harder comes the latest issue of the long-running Cosmopolitan Magazine with an all-inclusive indictment of "Dumb Fools in the Air," by J. C. Furnas. (You probably remember his graphic old article on auto traffic fatalities, "And Sudden Death—" which used to be required reading for accident drivers in police traffic courts.)

No one is more critical of the reckless behavior pilot than his fellow flyers. And it is probable that the new Furnas piece would have had a wholesale effect by accentuating some dangerous low flying antics. But once on someone's editor has made the Furnas indictment of the reckless pilot apply to the entire category of private plane pilots, by generalizing a method which reads: "There are no stupid people anywhere, then there are no private planes. Stupid? They are wrong, critical, driven, look. Let's get rid of them before they give a black eye to organized air service."

Does Washington say, and probably in other parts of the nation too, lightplane pilots and general civil aviation groups last week had a "flee burn" about the unscrupulous blanket indictment, which they note means forcing its letters to the magazine in New York.

HILLER APPOINTS REED—Appointment of J. D. Reed Co., of Houston, Dallas and New Orleans, as distributor for the Hiller 160 helicopter, says United Helicopter Inc., strong recommendation in this case, since Reed is widely known as the top-selling Beech distributor in the nation last year.

Reed's franchise will include Texas and Louisiana for the Hiller 160, which was approved by CAA for commercial sales some time back. Reed is establishing main helicopter service facilities on his new \$150,000 air base center in Houston, with field service setups at Dallas and New Orleans bases.

Helix helicopter sales effort will be concentrated on oil exploration, personnel transport, amphibious, or mail, charter and pilot training.

PIPER UPS CLIPPER PRODUCTION—Piper Aircraft is again producing on the four-place 52997 Clipper plane, from here to eight places a day, presumably to accommodate orders which the lowest-priced six, four-place has generated.

HOME AWAY FROM HOME—Charters being sent out by Regan Flying Service, of Shreveport, Ohio, tell a story of a new and thoughtful men and service to the personal aircraft pilots, which reads like each pilot's dream.

"Make this your office while in Shreveport. Why go to town?" asks the letter. "Assuming your arrival are the following accommodations: free hot coffee at any hour, free beds in clean heated guest rooms for overnight transient pilots and/or passengers. Clean heated restrooms, free shower towels, soap, free transportation to town, lounge room and table tennis room, free stenographic-typist service. We'll save you time, money and sleep, and have you on your way in early in daylight, if you wish. What are we selling? Fast, oil, storage shop service and parts."

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meanly that the long-haul commercial refrigerator which must be developed to boost commercial cargo volume to the three billion ton mile mark by 1975 should be capable of carrying a 15-ton payload 3000 miles at a cruising speed of 300 mph. Good for direct operating cost with 100 percent load factor was set at 3.75 cents a ton-mile, thus permitting freight tariffs of 9.10 cents a ton-mile.

• **Ramjet Differences**—The military states that the 15-ton payload transporter or avionics should be able to use 6000-ft runways. The prototype group wants its long-haul airbushes to be capable of using a 4000-ft field.

Both the second form and the prototype group believe the plan should be designed to permit loading and unloading from normal track bodies without the use of auxiliary equipment such as fork lifts. But the visitors say 16 inches is sufficient to permit the side-by-side entry of two 24-ton trailers on a double-track mainline. This is considerably wider than the loading provision for the long-haul carriages recommended by the Prototype Group.

While large commercial cargo airlines lay emphasis on the 2000 wide wing plane capable of operating from

wants a 3000-mile plane suited to practical aspects of trans-Atlantic weather.

► **Cargo Potential**—Stimulus for lowering direct operating costs of the long-range freightliner under four costs: a mile is heavily repurchased by commercial interests. The Prototype Group felt that the decrease in cargo volume would be three billion ton miles in 1995, only if rates can be brought down.

9-10 cm in a few miles, and are to smaller columns with better teeth.

At 14 cents a ton male cargo, only 1.7 billion ton miles was predicted for 1953. And at the 18-20 cents a ton mile average tariffs prevailing in 1948, a volume of but half a billion cargo ton miles was forecast.

By contrast, domestic airlines, both certificated and uncertificated, flew about 155 million cargo-ton miles during 1948. This included around 121 million freight ton miles and close to 34 million express ton miles.

• **CAA Study**—Civil Aviation Administration estimates estimated annual flow domestic air cargo volume would reach 1,130 million ton miles by 1995 if mile levels remain about the same as in 1990.

Plan for the production is a forecast that passenger mileage will increase from about 6 billion in 1948 to 11 billion in 1954 and that cargo ton mileage will equal passenger ton mileage by that time. OMAA used a conversion factor of 200 lb per passenger, including baggage to obtain the 1,170 million passenger-ton miles figure.

In supporting its forecast of continued realignment growth of air cargo, CAA pointed out that freight forms the bulk of traffic volume for all surface carriers. "Only the airlines have a preponderance of passenger business. "As air transportation approaches maturity, its traffic will tend to conform to the established pattern rather than remain unusual," CAA declared.

* Air cargo's rate of growth during the last ten years has been five times as fast as the growth of air passenger traffic. In 1945, cargo ton miles flown by the airlines were only 7.5 percent of passenger ton miles. In 1955, cargo ton miles were 15.5 percent of passenger ton miles, and by the first quarter of 1958 the figure had risen to 25.6 percent.

Growth Factors Listed—CAA states that a number of factors must fit the maintenance of a high rate of net crop growth during the next eight years. Among these are improvements in plant design, better service, decrease in the rate spread between on and surface cation extractions of special back-bone modification, increase in promotional activity and completion of the federal forest program.

Fifty percent industrial areas and metropolitan districts will account for around 76 percent of all generated domestic air cargo tonnage and for 51 percent of all terminated domestic air cargo tonnage by 1955, CAA believes. At present, there are 90 communities account for about 77 percent of all scheduled passenger tonnage and for over 99 percent of the scheduled airfreight tonnage in excess and on freight.

New Interests Sit On Western Board

New interests which joined the W. A. Coalition also have elected E. W. Bingham and L. Welch Payne, former chairman of the Civil Aeronautics Board, to the board of directors of Westwind, Inc. ▶

Some weeks ago a group headed by Nabors & Co. and Ross, Stevens & Co., stock holders, purchased more than 200,000 shares of Western stock from Coaltex at an average price of \$7.70 per

share. With only 521,664 shares of Western stock outstanding, the former Coultier holdings gave the new group effective control.

★ **Drinkwater**, Set-Based on agreement arranged at the time of his election as president. T. C. Drinkwater remains unaffected by the change of control. Under the terms of his contract, Drinkwater is to receive not less than \$35,000 annually from Jan. 1, 1947 through the end of 1951.

A provision in this agreement specifies that in the event of a violation

liquidation or a consolidation or merger, or sale of substantially all Western's assets, the entire amount under the contract will become immediately due and payable to Divi-sion. The Western president also continues to hold an option on 25,000 Western shares at \$9.574 per share as to Dec. 31, 1972.

► **Sole Prospect**—Westerns is faced with an investigation by C&B on its continued existence. While it is reported that the new interests in Westerns are sympathetic to the C&B program, reversing the way part of the action, the possible area of appreciation in Western values appears limited.

This has developed because the new group is playing for a speculative market advance in airline valuations or hoping to sell out to another carrier such as Pan American Airways. So far, reports of PAA interest in Western

Western's net equity amounted to \$6.47 per share, compared with \$8.21 a year earlier and only \$6.32 at the 1996 year-end.

The turnover over the Reconstruction Finance Corp. slightly less than \$6 million. This obligation is secured by virtually all of the company's assets.

For the year ended Dec. 31, 1948 Western and its subsidiary, Inland Air Lines, showed a net profit of \$134,780 or 26 cents per share, compared with a loss of \$945,313 for the previous year.

Results for 1945 were uniformly improved due to a restrictive mail program of \$1,851,000. This brought total mail revenues for the year to \$2,185,000 and compared with \$1,576,000 for the previous year. At the same time passenger revenues declined from \$70,115,000 in 1947 to \$7,813,000 in 1948.

The Western management is also paying for an additional award of \$915,000 in mail pay representing profits earned largely as a result of the sale of the Denver-Los Angeles route and related equipment in Sept. 1947.

On the basis of mail rates in effect for the period starting Jan. 1, 1949, total mail revenues for 1949 are estimated at around \$2,300,000.

Family Plan

More than 11 percent of American Airlines' passenger traffic moved under the first-of-the-week family plan during the first five months the promotional tariff was in effect—October through

Company officials report that Monday-Tuesday-Wednesday traffic, formerly 8.5 percent lower than other days, has been raised to the same level as the rest of the week. More than 10 percent

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of AN's family plan program are first income more than minor annual per centage.

Surveyors show that more than 60 percent of American's family plan programs would not have flown without the special tariff. The carrier estimates that more than 45 percent of total family plan income is not revenue which otherwise would not have been received.

Skycoach Threat?

Airline financial officials are investigating the possibility that new "incentive" multi-rate fares may act as a deterrent to large-scale reorganization with low fare promotional tariffs such as the fuel of the week, multi-rate, and special services.

In general, the formula, already established as proposed by CAA for fuel, the 10 domestic trunk carriers, intends to make it possible for a carrier to earn 7 or 8 percent profit at a passenger load factor which appears reasonably attainable. Then, for every 1 percent increase in passenger load factor achieved by the carrier above this point the load rate would drop around a cent a plane mile.

► **Daytime Code**—Normally there would be no incentive to the carrier to increase its passenger load factor since it would take in more revenue through a 1 percent increase in passenger load factor than it would lose through a 1 cent a plane mile rate reduction. Thus, both the carrier and the taxpayer would stand to gain by vigorous development of new business.

But what will be the effect of substantial reductions in passenger fares on the total revenue of airlines operating under sliding scale formulas? Promotional tariffs such as aircoach tend to develop new business, but any benefit derived by the airlines from load factor increases at less than 5 cents a mile could be canceled out either by the normal increase in fuel costs.

► **Place Under Fire**—A sliding scale incentive and rate may, these fuel, act to keep fares up at 5 cents a mile when a 3 percent gain in passenger load factor would be seen to mean more revenue to the carrier than the corresponding drop in fuel cost. Some industry officials believe that the combination of higher fuel costs and multi-rate fares should be revised when it is proposed that the carrier and the taxpayer.

Job Outlooks

The air transport industry is overcrowded with pilots, flight radio operators and navigators. Employment opportunities in a domestic airline job are not good.

That is the opinion of the Bureau of Labor Statistics as expressed in its recent survey, "Occupational Outlook Handbook." Here's how BLS sums up the situation:

- **Pilot—Overcrowded**, only most highly experienced and qualified men likely to get positions for some years. In the long run, number of pilots employed will increase.
- **Flight Radio Operator—Few** job opportunities. Overseeing of equipment under a great deal of maintenance and repair.
- **Navigator—Many openings** every year, but competition is keen.
- **Steward—Vacancies** occur frequently due to high turnover rate.
- **Flight Engineer—Openings** few and slow, mostly from within the company.
- **Navigational—Situation** same as with radio operator—few job opportunities.
- **Dispatcher—Candidates** out of luck; job filled by graduates or transfer.
- **Crewed Radio Operator and Teleoperator—Jobs** will increase, but only a few openings per year.
- **Mechanics—Job prospects** good for dual mechanics until 1950. On basis of present defense plans, heavier workload rate more favorable.
- **Traffic Controller—Some openings expected**, but all qualified applicants can't be absorbed.
- **Maintenance—Current shortage** will ease in a few years. Some expansion expected, but profession will never be a large one.

- **Stock and Store Clerk—Some openings** exist for your large-scale employment level.
- **Travel Agents and Clerk—Jobs** for overseas limited. This job group as a whole will grow slowly. In large travel jobs, growth will be more rapid.

ICAO Simplifies Air Travel Rules

New rules to simplify international air travel by eliminating many expense and cost requirements of the 11 member nations in the International Civil Aviation Organization have been passed by the ICAO Council, executive body of that group.

Eliminating three years of studies and meetings in Facilitation of International Air Transport Service and the Air Transport Committee of ICAO, the regulations will come into force May 1, 1950, unless disapproved by a ma-

jority of the ICAO membership.

► **Real Time**—Cost-Save cut down expenses involved in issuing international documents and providing information and control of fares required by authorities at airports of entry. Simple operation is expected to reduce much of the paper work that delays business and requires airlines to employ large clerical staffs. It is hoped that this reduction eventually will lower the cost of air travel and air cargo.

Included in the regulations is a provision to facilitate air-travel visa requirements for passengers arriving and departing on the same through flight. This would save out the need for producing passport and cargo documents for customs and immigration authorities during such flights.

An embolism declaration and filed out by each passenger during flight is designed to save the many forms now used to obtain immigration control information after arrival or before departure. Acceptance of this and also will eliminate necessity for travelers obtaining temporary entry permits, and may lead to the further reciprocal elimination of entrance visas for temporary visitors.

Regulations also provide that travel control and other public health procedures be carried out where possible during flight, and that governments should

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STRICTLY PERSONAL

RY'S ABOUT PEOPLE—Fowler (Soc) Barker became deputy chief of the traffic branch of the Office of International Trade, Dept. of Commerce, in Washington. At the present time, his main responsibility is to eliminate barriers and encourage low-cost transport to the Marshall Plus economic zone (PCA), although the Commerce Dept. still is pushing foreign trade on a world scale basis. Some pointed out that the Bureau of International Foreign Commerce last week. He has also written Voice of America broadcasts recently. • William C. Wolf has been assigned as New York manager of Consolidated Vultee Aircraft Corp., but will continue to be the company's sales representative on a contract basis. Wolf will engage in negotiations, sales promotion and special projects in William C. Wolf Associates, 900 Fifth Ave. • Paul E. Eichen, widely known public relations chief for Power Co. Inc., has been assigned to the, and may set up his own public relations firm. • John D. Waugh has been assigned as PEO at MetLife Products Div. at Koppers Co., Inc., in New Providence & Lobert, public relations contact, in NYC.

HONEYMOONERS, YOUNGER GENERATION—This appears in Times Canada Air Lines newsletter: "Honeymooners still find there about Times-Canada North Star aircraft among in Bermuda, most of these people being in the age group 11 to 10."

THOSE UNRAID BRITISH "RAPIDES"—The defuncted Greek airline from Great Britain with the story about the lady who became a mother during a flight on one of the British Airways' aircraft. The airline's management, the company said, "I really don't expect it," and the airline's new overseas pilot applied with "Medicine. I know these facts are slow, but they can't do it."

CONFIDENTIAL INSTRUCTION NEEDED—The American West still is considering a special aviation correspondence course: sent in plain envelope, for the operators who are not only, and the lady professionals who allegedly read it. Two days have changed our learned author's manuscript about "pilot tubes" to read "pilot tubes." If you don't know the difference, will send you the entire two.

HIGH JINKS AT THE SAE MEETING—Our own Bob McLennan just landed in from the SAE National Aeronautics and Air Transport Meeting at the Hotel New Yorker and reported that after a distinguished and well-known lecture by an SAE man on how they are improving their field, one J. G. Rogers, then American engineers, seemed it up with "Yes, sir, the airlines have told the oil companies to get the lead out of their gas."

And that eminent chief engineer from Douglas Aircraft, Mr. Arthur Remond, told the one about how Col. R. B. McClellan of the Chicago Tribune had an editorial campaign all planned to cause Chicago airport chief Gen. George Marshall, until one of his reporters asked why he wanted it called Marshall Field.

THAT'S A NEW NAME FOR THEM—Northwest was conducting a sight-seeing tour the other day in Seattle and on board were Avianco's Wynn's co-pilot, Ray Rosenburg, and his young son, Clyde. There are some turbulence, so Northwest's own Stevens brought out some spots of sunburn and burn ointment for possible use of a couple of his kids who looked pale. When asked why Clyde was wearing sunglasses, he said, "They, Dad, the other kids are getting melted, kids, when do I get mine?"

INTERNATIONAL COMBUSTION—Ben Decker of United Air Lines' San Francisco branch says there are no problems and as representatives of great contact serving of British Commonwealth Pacific Airlines' DC-4s. The affair day the Australian engineer visited a UAL crew to check the "accidents." The chief, voicing the hydraulic system pressure accumulator, said the pit was too big to be able on a through flight without causing a delay. When the plane and their own crew do it in five minutes, UAL, from were pretty red till someone figured out that a British accumulator is an American battery.

Then there was the time an Avianco said a mechanic to "get the tripod out of the locker." That meant, "get the tool shed out of the locker." The same one once followed a reference to the "tip pick" which turned out to be the coal Ray collector.

—E. H. W.

WHAT'S NEW

Trade Literature

"Hyman Aircraft Stock," a second edition of paper booklet containing descriptions and costs, weights, lengths and extra of engines, alloy and aluminum parts of aircraft and available for disposal. Available upon request to Publicity Division, Joseph T. Hyman & Son, Inc., 1000 N. Chicago St., Chicago 10, Ill.

"John-Marelli Products for the Aviation Industry," a 3-page brochure containing information on Thermoblen turbine bladders for use as jet aircraft and ground vehicles, ground vehicles, and other products. Available upon request to John-Marelli, 22 East 60 St., New York 16, N. Y.

"Bullefin," a 4-page folder describing Corbair, a pre-fabricating unit, and Inpace, an isolating plate, available from Corbair Chemical Laboratories, Inc., 172 Pacific St., Brooklyn 2, N. Y.

"Technical Bulletin T-7," a 4-page booklet on the treatment of metals, metal and high-velocity alloys to corrosion by sulphur acid, available upon request to International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.

"H.C. Hydraulic Standards for Industrial Equipment," a 16-page booklet compiled and approved by the six engineering groups of the Fluid Industry Conference, available upon request to Fluid Motor Co., 4327 N. Kedzie Ave., Chicago 18, Ill.

"Business Hydro-Check," an 8-page booklet on a device used for up-to-date equipment available from Hydro-Check Co., 222 W. Market St., Akron 5, Ohio, attention W. C. Richards, Jr.

"Naval Air Reserve Ready & Able," a booklet on the accomplishments of a typical Naval Reserve Career Group on its two-week training tour, available upon request to Chief of Naval Air Training, Washington 25, D. C.

"Aviation Institute Quarterly," a quarterly published by members department of the Aviation Institute, edited by Ernest M. Bristol. Available upon request to The Aviation Institute, 801 So. and Ave., New York 17, N. Y.

"Bulletin 1230," a 5-page catalog listing on Cast Inverter bolts, available upon request to R. F. Goodrich Co., Akron, Ohio.

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NATIONAL AIRCRAFT BOLTS

AM 2 thru AM 15—AN line head

AM 21 thru AM 35—AN line head

AM 37 thru AM 41—AN drilled head

AC 33 thru AC 92 (or NAS 33 thru NAS 92) line head close tolerance bolt



THE NATIONAL SCREW & MFG. CO.
CLEVELAND 4, OHIO

National Screw & Mfg. Co. of Cal.
1649 10th St., San Mateo, Cal.

A Bigger & Better Dinosaur

The New York Herald Tribune says the U. S. Government, through the Maritime Commission, has decided to pay \$42,285,784 of your money toward an American shipyard that "will go after a new trans Atlantic speed record." Total cost of the liner will be about \$70 million.

This "superliner" will be 980 feet long, gross 48,000 tons, and carry 2000 passengers (if she can contain them) in "luxury accommodations." It will take a thousand men to run it. As a troopship she will be able to carry a full division, her sponsors say, and she will be the largest passenger ship ever built in this country.

Vice Admiral William W. Smith, chairman of the Maritime Commission, described the decision to build the ship as "one of the most important the commission has ever made."

Now, in a troopship, please consider:

1. As far as you are concerned, it is worth even the initial \$42 million to buy a boat that will "go after" the mythical trans Atlantic blue ribbon? Or something better than 3 days, 20 hours, 42 minutes outboard?

2. Is it worth even the initial investment (ignoring maintenance and operating forever after) to substitute this new monster, instead of the America, as "the largest passenger ship ever built in this country?" (It does not compare in size with either the Queen Mary or Elizabeth).

3. Do you know that an superliner pays its way in commercial service, and that this new will require continual subsidy?

4. If troop ships are needed in national contingency, do you know we have literally hundreds of vessels in moth ball? And if you are thinking about the difference between 30 or 14 knots and 30 knots, do you think that wherever in emergencies time really gets to mean anything we will be content with surface transportation in an enlightened era of five-to-six months, 100 or 200 passenger ships?

So, if that word concoction of the Maritime Commission won't pay for itself commercially or be needed urgently in war, why should the American taxpayer finance the construction of an unequipped \$70 million dinosaur that will only break the speed record of other (and larger) dinosaurs?

John M. Franklin, president of the United States Lines, points out with strange pride that this liner "will be the first American ship that can compete with the best of foreign flag ships since the St. Louis and St. Paul were built in 1895 by the American Line," and he explains even further, "This nation has not owned a trans-Atlantic speed leader since the Collins Line's Pacific, whose crossing of 9 days, 19 hours, 25 minutes was made in May, 1851."

Now, Mr Franklin, so what? When are you going

out to establish the coal boat record for us, too?

If this represents one of the Maritime Commission's "most important" decisions we reiterate it at the same time as the most stupid and most expensive. Great Britain holds her two Queens in high esteem, but we will never the carry British would give them evidence if they had instead, America's leadership in air transport manufacturing and operation. It's difficult for us American to reduce how much national pride a Britisher must swallow to buy five U. S. Starliners through the Swedes, at paragon price, before even taking delivery of the six they already have on order from America.

The Maritime Commission is living in the past but the money it is costing us isn't.

We think Congress ought to look into this one.

The Coach Phenomenon

Capital Airlines President J. H. Caraculski revealed some astonishing figures to the New York Society of Security Analysts last week on the success of his company's pioneering air coach service.

In the 12 months to Nov. 4, 1948, Capital earned a total of 1047 through passengers between Chicago and New York. An coach service began Nov. 4.

In the first five months of air coach service the line earned slightly more than 20,000 passengers.

Capital's load factor phenomenon, especially since it began air coach flights on other segments, has been very steady. Coach planes, because they leave in the early hours of the morning, pick up heavy mail and cargo loads. Few regular fare planes have ever departed late at night.

President Caraculski reports that with air coaches Capital has added 5000 miles of flying a day by losing only about 20 more passengers. He says fully that air coach is profitable.

He estimates that 75 percent of Capital's coach passengers would not have flown at all if low as fares had not been reduced. Nearly all of the 75 percent represented newly generated business. About 20 to 25 percent of the coach passengers represent diversion from regular air service, according to questionnaires.

But in Caraculski's opinion, many passengers who make their first flight because of price had they had flying low enough to ride first class next time. By introducing hundreds of passengers to the advantages of air transportation, Capital believes it is making new customers not only for itself, but for the entire industry. We believe it too.

And while some executives are pointing out that regular fare business is heading for new highs as we get into fine weather, we say what makes them think reduced rates travel shouldn't rise even higher and faster?

ROBERT H. WOOD



The *Passenger* is the payoff

Commercial airline operators pay off for the airline and for the aviation equipment manufacturer only if a passenger and satisfies the contract—the passenger.

The objective of Sperry, for instance, is to build equipment that helps the airline give the passenger a smoother, safer, more comfortable ride. He is the man toward whom much of the engineering skill, research and development work at Sperry is aimed.

Behind the man in the pinstriped suit and the cockpit of every modern airliner stands research and engineering skill. Sperry provides for airline use, for

example, the A-12 Gyroscopic for smooth landings. The Automatic Approach Control for landings in all kinds of weather. The Gyroscopic Compass and other flight instruments for accurate information on position and direction. The Engine Analyzer to check engine performance during flight. Many reliable, new and better tools for aviation.

These and other products of Sperry are designed to help the passenger enjoy his trip from take-off to landing—to ensure that it is a pleasant, relaxed, refreshed and on time.

Meanwhile, Sperry research and engineering development go on in a continuous search for new and better tools for aviation.

—Continued on p. 10, col. 10

SPERRY GYROSCOPE COMPANY
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NEW YORK LOS ANGELES SAN FRANCISCO • NEW ORLEANS • CHICAGO • SEATTLE



This fleet of Bonanzas makes a business go ... and grow!



Key men of Weatherford Oil Tool Company, Texas, really get around with their seven-plane fleet of 4-place Bonanzas. Weatherford makes oil well tools and equipment, has 38 distribution centers in ten states. The sales situation, as in many another business, calls for fast action. They get it—by Bonanza!



"Now we can increase our sales calls by 40% over those we could make by fastest public transportation," says President J. E. Hall, Jr. "If we hear of a potential sale in another state, we have a man there in hours. And customers like fast action when waiting for equipment. Oil rig time is expensive. Now our men, with equipment, get there pronto by Bonanza."



Sales Manager John Hall even uses his Bonanza as "reconnaissance"; spots well locations from the air, follows up with sales calls. Because Bonanzas are quiet and comfortable, they're ideal as customer transports. Cost of operation? About the same gas and oil consumption per mile as an auto! This Bonanza fleet is a profitable, paying proposition.

Travel on business? Investigate Bonanza Travel

Apply this revolutionary business "machine" to your business. It means you slice travel-time by two-thirds... a saving you put to profitable use. Investigate. A note on your company letterhead brings an informative 60-page brochure on "The Air Fleet of American Business." Write today to Beech Aircraft Corporation, Wichita, Kansas, U. S. A.

Top speed 184 mph
Cruising speed, 170 mph
Range 750 miles

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